



China: The Cement Industry in 1972

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Table 1

China: Cement Production

	Million Metric Tons		
	Total	Modern Plants	Small Plants
1965	13.9	10.5	3.4
1966	15.3	11.6	3.7
1967	13.2	9.9	3.3
1968	13.6	10.2	3.4
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1970	20.8	12.9	7.9
1971	24.2	14.5	9.7
1972	29.8	15.5	14.3

Although significant growth has occurred in the modern sector, the advance in output from the small plant sector has been phenomenal. As a share of total cement production, the small plants contributed 24% in 1965 and 48% in 1972. Cement from these plants, although of roughcast quality, is suitable for numerous building projects in rural areas. As a result, the central government can channel most of the output of modern plants into the advanced sectors of the economy.

The Modern Sector

2. The modern sector of the Chinese cement industry consists of 56 known plants with a total of 125 rotary kilns (see Table 2). Two new kilns are currently under construction, one in Fukien and one in Kiangsi. The modern sector produced 15.5

Note: Comments and queries regarding this publication are welcomed. They may be directed to [REDACTED] 25X1A
[REDACTED] of the Office of Economic Research, Code 143, Extension 7107.

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Table 2

China: Modern Cement Plants and Production
1972

Region and Province	Number of Modern Plants	Number of Rotary Kilns	Thousand Metric Tons Estimated Output	Thousand Metric Tons Estimated Capacity
Total	56	125	15,500¹	17,750
Northeast	11	19	....	3,040
Heilungkiang	2	3	....	640
Kirin	2	3	425	500
Liaoning	7	13	....	1,900
North	8	24	....	2,740
Honan	2	3	....	450
Hopeh	2	9	....	700
Inner Mongolian Autonomous Region	1	2	....	300
Peking and Tientsin	....	....	....	....
Shansi	2	6	....	750
Shantung	1	4	430	540
East	9	22	2,490	2,950
Anhwei	1	3	360	450
Chekiang	3	4	540	600
Kiangsu	3	8	960	1,200
Shanghai	2	7	630	700
Central	9	14	....	2,150
Hunan	2	3	....	450
Hupei	5	9	....	1,450
Kiangsi	2	2	....	250
South	7	16	1,690	2,120
Fukien	2	3	280	350
Kwangsi Chuang	1	3	350	450
Kwangtung	4	10	1,060	1,320
Southwest	9	21	....	3,200
Kweichow	3	7	....	900
Szechuan	4	10	....	1,700
Tibet	....	....	....	....
Yunnan	2	4	480	600
Northwest	3	9	1,345	1,550
Kansu	1	4	400	500
Ningsia	....	....	....	....
Shensi	1	3	810	900
Sinkiang	1	2	135	150
Tsinghai	....	....	....	....

1. The total output figure does not represent the total of the partial output figures below it; instead it was derived from other sources. This output represents utilization rate of about 90% of midyear capacity, which is comparable with that of most other countries.

Table 3

China: Modern Cement Plant Capacity,
Output, and Utilization Rate

	Million Metric Tons		Utilization Rate ¹ (Percent)
	Yearend Capacity	Output	
1965	14.10	10.50	....
1966	14.25	11.60	81.8
1967	14.40	9.90	69.1
1968	14.60	10.20	70.3
1969	15.50	11.90	79.1
1970	16.00	12.90	81.9
1971	16.70	14.50	88.7
1972	17.75	15.50	90.0

1. Output as a percent of midyear capacity. Midyear capacity is the average of the capacity at the beginning and the end of the calendar year.

million tons in 1972, indicating a utilization rate of 90% of capacity (see Table 3). This utilization rate is comparable with that of other countries.¹ Plans for expansion at existing plants should add at least 750,000 tons per year of new capacity by the end of 1973, which would raise total capacity to about 18.5 million tons and output to about 16.5 million tons.

3. The modern sector operated well below capacity during the economic retrenchment of the early 1960s, and production was disrupted during the Cultural Revolution (1966-69). Since 1969 a step-up in production has taken up this slack; output has increased almost twice as fast as capacity. Thus, future growth in output must come from additions to plant capacity. Recent construction activity has required a 7%-10% annual increase in output of high-quality cement, and new uses for cement have been developing. With a scarce timber resource base, cement is increasingly replacing lumber for

1. For example, the average for 1954-68 for Brazil was 87%, varying from 79% to 94%.

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use as railroad ties, pit props for mines, towers for electric transmission lines, and in a small but thriving cement boat industry (a 3,000-ton wire-mesh reinforced concrete coastal cargo ship was launched 9 April 1973).

The Small Plant Sector

4. In the past few years, Chinese public statements on the cement industry have stressed the importance of the small plant sector. These statements indicate that the "over 2,400" small cement plants produced almost one-half of total national production in 1972. Since 1965 the average annual increase in output from these small plants has been four times that of the modern sector -- 23% for small plants, compared with nearly 6% for large plants.

5. The small plant program was a Leap Forward project, which fell into disuse during the early 1960s when many of the plants were abandoned. The output of the small plants, revived during the Cultural Revolution, has grown at an average annual rate of 31% since 1969. By the end of 1971, China had 1,800 small plants, and an additional 600 were built in 1972. An increase in efficiency is indicated by the estimate of average output per plant in 1972 of 5,960 tons (see Table 4), compared with the 1971 average of 5,400 tons. Concurrent with the growth of the number of plants and the increase in output per plant, the grade of output has improved to more usable levels. The average grade of cement² produced in small plants, which was 150 in 1960, has been raised to about 400. Although not sufficiently strong for major loadbearing structures (grade 500 or better is needed for bridges, buildings, etc.), this cement is good enough for rural hydrology projects, sidewalks, and surfacing of floors in buildings and tunnels.

6. The growth of the small plant sector, which frees the modern sector from pressure to supply cement for rural use, allows larger amounts of high-quality cement produced in modern rotary kilns to be supplied for military and industrial construction. The Chinese claim that 70% to 80% of the output of small plants goes to the agricultural sector.

2. The grade is a quality measurement. Grade 400, when made into concrete, will withstand a pressure of 400 kilograms per square centimeter.

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Table 4

China: Small Cement Plants and Production
1972

Region and Province	Number of Small Plants	Thousand Metric Tons	
		Estimated Output	Average Output
Total	2,400 ¹	14,300 ²	5.96
Northeast	266 ³	....	....
Heilungkiang	47 ³	....	....
Kirin	117	434	3.71
Liaoning	102	....	....
North	704	....	....
Honan	100	....	....
Hopeh	129	....	....
Inner Mongolian Autonomous Region	40	....	....
Peking and Tientsin	N.A.	....	....
Shansi	225	....	....
Shantung	210	1,000	4.76
East	250	2,830	11.32
Anhwei	77	720	9.35
Chekiang	80	1,150	14.38
Kiangsu	93	960	10.32
Shanghai	N.A.	....	....
Central	138 ³	....	....
Hunan	2 ³	....	....
Hupei	9 ³	....	....
Kiangsi	127	....	....
South	321	3,245	10.11
Fukien	59	410	6.95
Kwangsi Chuang	112	250	2.23
Kwangtung	150	2,585	17.23
Southwest	86 ³	....	....
Kweichow	N.A.	....	....
Szechuan	N.A.	....	....
Tibet	2 ³	....	....
Yunnan	84	206	2.45
Northwest	491 ³	....	....
Kansu	77	120	1.56
Ningsia	24 ³	....	....
Shensi	307 ⁴	382	1.24
Sinkiang	80	135	1.69
Tsinghai	3 ³	....	....

1. The Chinese press claimed more than 2,400 small cement plants. Of the 2,400 small plants, 2,256 are accounted for in this table.

2. The total output figure does not represent the total of the partial output figures below it; instead it was derived from other sources.

3. Representing minimum figures derived from adding all individual plants mentioned in the open press. No aggregate figure was given.

4. In Shensi Province, 107 plants are run at or above the county level and 200 others are run by communes. The commune plants appear to be very small and thereby distort the average output downward.

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Regional Distribution of Cement Production

7. The geographic distribution of modern cement plant capacity has altered strikingly during the last two decades. In 1949 the modern cement capacity was concentrated in the northeast and along the coast, with little or nothing in interior provinces. New plants have been built in the regions that were cement deficit. Production in the interior regions has now been adjusted so that the proportion of modern cement capacity approximates the proportion of population except in the north region. The north region, however, is compensated for this deficit by a disproportionate number of small plants (see Table 5). As an example of the magnitude of this

Table 5

China: The Cement Industry -- Regional Statistics
1972

Region	Total Number of Small Plants	Total Capacity of Modern Plants	Population ¹	Percent
				Land Area
Total	100.0	100.0	100.0	100.0
Northeast	11.1	17.1	8.6	12.6
North	29.3	15.4	26.4	11.6
East	10.4 ²	16.6	17.2	3.8
Central	5.8	12.1	13.3	5.9
South	13.4 ²	11.9	11.2	6.0
Southwest	3.6	18.0	17.0	25.2
Northwest	20.5	8.7	6.3	34.9
Unlocated	6.0 ³	....	....	....

1. Population is based on 1957 estimates.

2. The small plants in these areas appear to have higher than average yearly outputs, compensating in part for the lower percentage figures.

3. Most of the unlocated plants are probably in the central and southwest regions.

change, the industrial northeast, which had 42% of modern capacity in 1952, has seen its share fall to 35% in 1957, 28% in 1965, and 17% currently. Although changes of this size are not expected for the future, development will continue for the areas that now have to bear high freight charges for cement. In Tibet, which has no modern plants, the price of cement can be as high as five times the ceiling price in the vicinity of a modern plant -- the

difference being due to motor vehicle transport charges.

8. The majority of small plants are in areas that have little modern capacity, such as the underdeveloped northwest.³ While a greater number of small plants are distributed in the cement-poor regions, considerable variation exists among plants in levels of output. The 491 small plants in the northwest have a yearly output averaging between 1,200 and 1,700 tons, whereas the 250 plants in the eastern region average more than 11,000 tons. These figures indicate that the most efficient plants in the small plant sector are concentrated in the eastern and southern regions. The east, with 10% of the small plants, produced 20% of the small plant output in 1972, whereas the northwest, with 20% of China's small plants, produced only 6% of the output.

3. Because capacity figures are not available for small plants, the number of plants is used as a less accurate -- but available -- substitute.

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Although significant growth has occurred in the modern sector, the advance in output from the small plant sector has been phenomenal. As a share of total cement production, the small plants contributed 24% in 1965 and 48% in 1972. Cement from these plants, although of roughcast quality, is suitable for numerous building projects in rural areas. As a result, the central government can channel most of the output of modern plants into the advanced sectors of the economy.

The Modern Sector

2. The modern sector of the Chinese cement industry consists of 56 known plants with a total of 125 rotary kilns (see Table 2). Two new kilns are currently under construction, one in Fukien and one in Kiangsi. The modern sector produced 15.5

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Analyst: [REDACTED] C/CH

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17 JUL 1973

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1 Attachment

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